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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/502,454	02/11/2000	Naoki Soeda	F-9680	5175

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EXAMINER
CHEN, TIANJIE

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/502,454	SOEDA, NAOKI	
	Examiner	Art Unit	
	Tianjie Chen	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2002 and 13 December 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-10,12 and 14-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-10,12 and 14-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Non-Final Rejection (RCE)

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 11/21/2002 and 12/13/2002 have been entered. Claims 1-3, 5-10, 12, and 14-16 are pending.

Claim Objections

2. Claim 1 is objected to because of the following informalities:

- In claim 1, line 3, "a first printed-circuit board which is" should be changed to --two first printed-circuit boards which are--.
- In claim 1, lines 10 and 11; "first printed-circuit board" should be changed to --first printed-circuit boards--; respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1—3, 5-10, 12, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao et al (JP 5-81846A) in view of Kau et al (US 6,421,754).

With regard to claim 1, Takao et al shows a magnetic disk apparatus in Fig. 1 including: a disk enclosure 12-14, a first printed-circuit board 2a, which is paired with the disk enclosure, and a second printed-circuit board 2b, which is connected to the first printed circuit board 2a via a cable 27 ([0044]; Figs. 6(a) and 6(b)) and is separated in structure from the first printed-circuit board 2a (Fig. 12); wherein the first printed-circuit board mounts circuits which have a first noise resistance property, and a circuit 24 which holds parameters unique to the disk enclosure ([0015]); and wherein the second printed circuit board 2b mounts circuits which have a second noise resistance property; wherein the second printed-circuit board 2b is separated from an upper system in structure (Figs. 4 and 5) and includes an interface circuit 5 that interfaces with the upper system.

Takao et al does not show that the second noise resistance property is superior to the first noise resistance property.

Office Notice is taken: as shown in Takao the first printed-circuit includes a circuit reading signal from a disk and amplifying the signal and then converting it into a digital signal. The original signal read form the disk is on the order of tens of mv (10^{-2} Volts); therefore, the first noise resistance property could only resist a noise of millivolts (10^{-3} Volts). And the second printed-circuit board includes data processing circuit, which is generally having IC chips, which deals with digitized signal having amplitude of 3-5 volts; therefore, the second noise resistance property could resist a noise of hundreds of millivolts (10^{-1} Volts).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to find that the second noise resistance property is superior to the first noise resistance property. The rationale is as follows: the second noise

resistance property could resist a noise of 10^{-1} Volts, which is superior to the first noise resistance property, which could only resist a noise of 10^{-3} Volts.

Takao et al does not show two first printed-circuit boards and the circuits on the second printed-circuit board includes a switch for selecting either of one of the first printed-circuit boards connected to the second printed-circuit board and another of the first printed-circuit boards connected to the second printed-circuit board.

Kau et al shows a system including two disk drives (HDD and FDD), which interface with an I/O circuit on a circuit board 87 (Fig.3; column 9, lines 46-50).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add one more disk drive with a first printed-circuit board as shown by Takao et al into Takao et al's device and make them being able to communicate with the I/O circuit on the second printed-circuit board as taught by Kau et al. Such constructed device would have two first printed-circuit boards and the circuits on the second printed-circuit board includes a switch for selecting either of one of the first the first printed-circuit boards connected to the second printed-circuit board and another of the first printed-circuit boards connected to the second printed-circuit board. The rationale is as follows: it is well known in the art that most of the computer has more than one disk drive. For example, a home computer always has a hard disk drive and a floppy disk drive. The additional floppy disk drive, at least, provides possibility for boosting the computer when the HDD fails to do so. One of ordinary skill in the art would have been motivated by Kau et al's teaching to add second disk drive into Takao et al's device for at least for boosting the computer by a floppy disc. Takao has shown that there is a first printed-circuit board in the disk drive (Fig. 2), therefore, in such constructed device, there would be one first printed-

circuit board in HDD and one first printed-circuit board in FDD. Kau et al further shows that the I/O circuit interfaces with HDD and FDD (Column 9, lines 46-50). It is also well known in the art the computer always interfaces with one of the disk drives. As example, as one of ordinary skill in the art uses home computer, one can select the drive to be interfaced from the window on the screen, thus one can switch from one drive to other newly selected drive. Therefore, the I/O circuit inherit a switch circuit for selecting either of one of the first the first printed-circuit boards and another of the first printed-circuit boards. Kau et al shows that the FDD and FDD interface with I/O, Takao et al shows that the first printed-circuit on the disk drive interfaces with the second printed-circuit 2b; therefore, the first printed boards on HDD and FDD would have been connected to the second printed-circuit board, which has I/O circuit with switch on it.

With regard to claim 2, Takao et al further shows that the first printed circuit board includes recording/reproduction control circuit 7 ([0014]).

With regard to claim 3, Takao et al shows an apparatus as described above, but does not explicitly show that circuit board 2a has an analog/digital converter.

But Takao et al shows that signal is read from the head by circuit 7 (line 1 in [0014]) and delivered to a logic operation circuit 6 (line 2 in [0013]).

It would have been obvious to provide an analog/digital converter in circuit board 2a. The rationale is as follows: the logic operation circuit deals with digital signals, the signals read from the head are analog. Therefore, an analog/digital converter in 2a is a necessity to convert the analog signals from 7 into digital signals, then feeding it into the logic operation circuit 6 through the connectors 3a and 3b.

One of ordinary skill in the art would have been expecting an analog/digit converter in the circuit board 2a for feeding digit signals into the logic operation circuit.

With regard to claim 5, Takao et al further shows that the circuits on the second printed-circuit board include a processor 6 ([0013]).

With regard to claim 6, Takao et al further shows that the circuits on the second printed-circuit board include a spindle motor/voice coil motor control circuit ([0027]).

With regard to claim 7, Takao et al further shows that the first printed-circuit board further mounts a connector, which inherits some degree of elasticity.

With regard to claim 8, Takao et al shows that the circuits on the second printed-circuit board include a spindle motor/voice coil motor control circuit ([0027]).

With regard to claim 9, Takao et al shows that the circuits on the second printed-circuit board further include a single processor 4 and 6 ([0030].

With regard to claim 10, Takao et al further shows that the circuits on the second printed-circuit board include an interface circuit 5 ([0030]) with an upper system.

With regard to claim 12, Takao et al shows that the circuits on the second printed-circuit board are separated into a third printed circuit board 5 and a fourth printed circuit 6; wherein the third printed circuit board mounts the interface control circuit 5 and wherein the fourth printed circuit board mounts the logic calculation circuits 6.

Takao et al does not show that the circuits on the fourth printed circuit board is better in noise resistance than the interference control circuit.

It would have been obvious at the time the invention was made to one of ordinary skill to expect that in Takao et al's device that the circuits on the fourth printed circuit board is better in noise resistance than the interference control circuit. The rationale is as follows: the interface control unit works with a current, which is much larger than the current in the logic operation circuit. And the logic operation circuit is much sensitive to the noise, because even a low level noise can cause miscalculation in the logic operation circuit. One of ordinary skill would have been motivated to make the fourth printed circuit board is better in noise resistance than the interference control circuit in order to ensure the logic operation circuit working properly.

With regard to claim 14, Takao et al shows that the circuits on the second printed-circuit board include a processor 4 and 6 ([0013]).

With regard to claim 15, Takao et al shows that the circuits on the second printed-circuit board include a spindle motor/voice coil motor control circuit ([0027]).

With regard to claim 16, Takao further shows an embodiment in Fig. 3, wherein the second printed-circuit board 2b is separated into a third printed circuit board 5 and a fourth printed-circuit board 6 in structure, and wherein the third circuit board 5 is separated from an upper system in structure (Fig, 4) mounts an interface control circuit 5, and wherein the fourth printed circuit board 6 is separated from the upper system in structure and mounts the circuits other than the interface control circuit.

Response to Arguments

4. Applicant's arguments with respect to claims 1, 12, and 16 have been considered but are moot in view of the new ground(s) of rejection.

- Applicant's argument about the "switch" and second "first printed-circuit board" is moot in view of the new ground of rejection. One of ordinary skill in the art should have the knowledge of a home computer.
- Applicant argues the term "separated in structure."

  Examiner's position: none detailed structural limitation to support the term of "separated in structure" has been found in specification, figures, and claims. The term "separated in structure" can be understood in various ways. If two portions have separated elements can also be considered as "separated in structure."
- The references for supporting the Official Notice are attached. In Tagawa et al (US 6,094,325) shows that the original signal read form the disk is on the order of tens of mv (10^{-2} Volts) (Fig. 10; column 11, line 63 to column 12, line 4); and Fravel et al (US 5,817,963) shows that an IC chip having signal with amplitude of 3-5 volts (4, lines 8-19).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-6037 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Tianjie Chen
Examiner
Art Unit 2652

February 14, 2003